

## WHAT IS CLAIMED:

1. A purified DNA molecule encoding HG51 which comprises the nucleotide sequence:

5 GGGGCCACGG GGGGTGCGCC GCGCGCGCGT AGCGCGGGCC CCTCAGTGCA CAATGGCCAG  
AGCAGGCGGC GGAGCCCCAG CCCACCCAG TCGGAGCGC GCCGCGAGCC CCGCCGAAG  
CTGAGCGCCT CCGCCCGCCA GCGCGCGCGG CGCCGGGCCA TGTACTCGGG GAACCGCAGC  
GGCGGCCACG GCTACTGGGA CGGCGGCGGG GCCGCGGGCG CTGAGGGGCC GGCGCCGGCG  
GGGACACTGA GCGCCGCGCC CCTCTTCAGC CCCGGCACCT ACGAGCGCCT GGCGCTGCTG  
CTGGGCTCCA TTGGGCTGCT GGGCGTCGGC AACAACTGC TGGTGCTCGT CCTCTACTAC  
10 AAGTTCCAGC GGCTCCGCAC TCCCACTCAC CTCCTCCTGG TCAACATCAG CCTCAGCGAC  
CTGCTGGTGT CCCTCTTCGG GGTACCTTT ACCTTCGTGT CCTGCCTGAG GAACGGCTGG  
GTGTGGGACA CCGTGGGCTG CGTGTGGGAC GGGTTTAGCG GCAGCCTCTT CGGGATTGTT  
TCCATTGCCA CCCTAACCGT GCTGGCCTAT GAACGTTACA TTCGCGTGGT CCATGCCAGA  
GTGATCAATT TTTCTGGGC CTGGAGGGCC ATTACCTACA TCTGGCTCTA CTCCTGGCG  
15 TGGGCAGGAG CACCTCTCCT GGGATGGAAC AGGTACATCC TGGACGTACA CGGACTAGGC  
TGCACTGTGG ACTGAAAATC CAAGGATGCC AACGATTCCT CCTTTGTGCT TTTCTTATTT  
CTTGGCTGCC TGGTGGTGCC CCTGGGTGTC ATAGCCCAT TCTATGGCCA TATTCTATAT  
TCCATTGCAA TGCTTCGTTG TGTGGAAGAT CTCAGACAA TTCAAGTGAT CAAGATTTTA  
AAATATGAAA AGAAACTGGC CAAAATGTGC TTTTAAATGA TATTCACCTT CTGGTCTGT  
20 TGGATGCCTT ATATCGTGAT CTGCTTCTTG GTGGTTAATG GTCATGGTCA CCTGGTCACT  
CCAACAATAT CTATTGTTTC GTACCTCTTT GCTAAATCGA ACACTGTATA CAATCCAGTG  
ATTTATGTCT TCATGATCAG AAAGTTTCGA AGATCCCTTT TGCAGCTTCT GTGCCTCCGA  
CTGCTGAGGT GCCAGAGGCC TGCTAAAGAC CTACCAGCAG CTGGAAGTGA AATGCAGATC  
AGACCCATTG TGATGTCACA GAAAGATGGG GACAGGCCAA AGAAAAAAGT GACTTTCAAC  
25 TCTTCTTCCA TCATTTTAT CATCACCAGT GATGAATCAC TGTCAGTTGA CGACAGCGAC  
AAAACCAATG GGTCCAAAGT TGATGTAATC CAAGTTCGTC CTTTGTAGGA ATGAAGAATG  
GCAACGAAAG ATGGGGCCTT AAATTGGATG CCACTTTTGG ACTTTCATCA TAAGAAGTGT  
CTGGAATACC CGTTCTATGT AATATCAACA GAACCTTGTG GTCCAGCAGG AAATCCGAAT  
TGCCCATATG CTCTGGGCC TCAGGAAGAG GTTGAAC , disclosed herein as SEQ ID  
30 NO:1.

2. A purified DNA molecule encoding human HG51 wherein said DNA molecule encodes a protein comprising the amino acid sequence:

MYSGNRSGGH GYWDGGAAG AEGPAPAGTL SPAPLFSPGT YERLALLGS IGLLGVGNNL  
 LVLVLYYKFQ RLRTPTHLLL VNISLSDLLV SLFGVTFTFV SCLRNGWVWD TVGCVWDGFS  
 GSLFGIVSIA TLTVLAYERI IRVVHARVIN FSWAWRAITY IWLYSLAWAG APLLGWNRYY  
 LDVHGLGCTV DWKSKDANDS SFVLFLFLGC LVPPLGVIAH CYGHILYSIR MLRCVEDLQT  
 5 IQVIKILKYE KKLAKMCFLM IFTFLVCWMP YIVICFLVVN GHGHLVTPTI SIVSYLFAKS  
 NTVYNPVIYV FMIRKFRRSL LQLLCLRLLR CQRPADLPA AGSEMQRPI VMSQKDGDRP  
 KKKVTFNSSS IIFIITSDES LSVDDSDKTN GSKVDVIQVR PL , which is disclosed herein  
 in the three letter amino acid code as set forth in SEQ ID NO:2.

- 10                    3.     An expression vector for the expression of a HG51 protein in a recombinant host cell wherein said expression vector comprises a DNA molecule which encodes the amino acid sequence of claim 2.
- 15                    4.     An expression vector of claim 3 which is a eukaryotic expression vector.
5.     An expression vector of claim 3 which is a prokaryotic expression vector.
- 20                    6.     A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 3.
7.     A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 4.
- 25                    8.     A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 5.
9.     A subcellular membrane fraction obtained from the host cell of claim 6 which contains recombinant HG51.
- 30                    10.    A subcellular membrane fraction obtained from the host cell of claim 7 which contains recombinant HG51.

11. A subcellular membrane fraction obtained from the host cell of claim 8 which contains recombinant HG51.

12. A purified DNA molecule encoding HG51 which consists of the nucleotide sequence:

5 GGGGCCACGG GGGGTGCGCC GGC GCGCGGT AGCGCGGGCC CCTCAGTGCA CAATGGCCAG  
AGCAGGCGGC GGAGCCCCAG CCCACCCAG TCGGAGCGC GCCGCGAGCC CCGCCGCAAG  
CTGAGCGCCT CCGCCCGCCA GGC GCGCGCGG CGCCGGGCCA TGTACTCGGG GAACCGCAGC  
GGCGGCCACG GCTACTGGGA CGGCGGCGGG GCCGCGGGCG CTGAGGGGCC GGCGCCGGCG  
10 GGGACACTGA GCGCCGCGCC CCTCTTCAGC CCCGGCACCT ACGAGCGCCT GGCCTGTGCT  
CTGGGCTCCA TTGGGCTGCT GGGCGTCGGC AACAACCTGC TGGTGCTCGT CCTCTACTAC  
AAGTTCCAGC GGCTCCGCAC TCCACTCAC CTCCTCCTGG TCAACATCAG CCTCAGCGAC  
CTGCTGGTGT CCCTCTTCGG GGTACCTTT ACCTTCGTGT CCTGCCTGAG GAACGGCTGG  
GTGTGGGACA CCGTGGGCTG CGTGTGGGAC GGGTTTAGCG GCAGCCTCTT CGGGATTGTT  
15 TCCATTGCCA CCCTAACCGT GCTGGCCTAT GAACGTTACA TTCGCGTGGT CCATGCCAGA  
GTGATCAATT TTTCCTGGGC CTGGAGGGCC ATTACCTACA TCTGGCTCTA CTCACTGGCG  
TGGGCAGGAG CACCTCTCCT GGGATGGAAC AGGTACATCC TGGACGTACA CGGACTAGGC  
TGCACTGTGG ACTGGAAATC CAAGGATGCC AACGATTCCT CCTTTGTGCT TTTCTTATTT  
CTTGGCTGCC TGGTGGTGCC CCTGGGTGTC ATAGCCCATT GCTATGGCCA TATTCTATAT  
20 TCCATTGCAA TGCTTCGTTG TGTGGAAGAT CTTAGACAA TTCAAGTGAT CAAGATTTTA  
AAATATGAAA AGAACTGGC CAAAATGTGC TTTTAAATGA TATTCACCTT CCTGGTCTGT  
TGGATGCCTT ATATCGTGAT CTGCTTCTTG GTGGTTAATG GTCATGGTCA CCTGGTCACT  
CCAACAATAT CTATTGTTTC GTACCTCTTT GCTAAATCGA AACTGTATA CAATCCAGTG  
ATTTATGTCT TCATGATCAG AAAGTTTCGA AGATCCCTTT TGCAGCTTCT GTGCCTCCGA  
25 CTGCTGAGGT GCCAGAGGCC TGCTAAAGAC CTACCAGCAG CTGGAAGTGA AATGCAGATC  
AGACCCATTG TGATGTCACA GAAAGATGGG GACAGGCCAA AGAAAAAGT GACTTTCAAC  
TCTTCTTCCA TCATTTTTAT CATCACCAGT GATGAATCAC TGTCAGTTGA CGACAGCGAC  
AAAACCAATG GGTCCAAAGT TGATGTAATC CAAGTTCGTC CTTTGTAGGA ATGAAGAATG  
GCAACGAAAG ATGGGGCCTT AAATTGGATG CCACTTTTGG ACTTTCATCA TAAGAAGTGT  
30 CTGGAATACC CGTTCTATGT AATATCAACA GAACCTTGTG GTCCAGCAGG AAATCCGAAT  
TGCCCATATG CTCTTGGGCC TCAGGAAGAG GTTGAAC , disclosed herein as SEQ ID  
NO:1.

13. The purified DNA molecule of claim 12 which consists of a nucleotide sequence from nucleotide 160 to nucleotide 1368 of SEQ ID NO:1.

5 14. An expression vector for the expression of a HG51 protein in a recombinant host cell wherein said expression vector comprises a DNA molecule of claim 13.

10 15. An expression vector of claim 14 which is a eukaryotic expression vector.

16. An expression vector of claim 14 which is a prokaryotic expression vector.

15 17. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 14.

18. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 15.

20 19. A host cell which expresses a recombinant HG51 protein wherein said host cell contains the expression vector of claim 16.

25 20. A subcellular membrane fraction obtained from the host cell of claim 17 which contains recombinant HG51 protein.

21. A subcellular membrane fraction obtained from the host cell of claim 18 which contains recombinant HG51 protein.

30 22. A subcellular membrane fraction obtained from the host cell of claim 19 which contains recombinant HG51 protein.

23. A purified HG51 protein which comprises the amino acid sequence:

MYSGNRSGGH GYWDGGGAAG AEGPAPAGTL SPAPLFSPGT YERLALLLGS IGLLGVGNNL  
 LVLVLYYKFQ RLRTPTHLLL VNISLSDLLV SLFGVTFTFV SCLRNGWVWD TVGCVWDGFS  
 GSLFGIVSIA TLTVLAYERI IRVVHARVIN FSWAWRAITY IWLYSLAWAG APLLGWNRYI  
 LDVHGLGCTV DWKSKDANDS SFVLFLFLGC LVVPLGVIAH CYGHILYSIR MLRCVEDLQT  
 5 IQVIKILKYE KKLAKMCFLM IFTFLVCWMP YIVICFLVVN GHGHLVTPTI SIVSYLFAKS  
 NTVYNPVIYV FMIRKFRRSL LQLLCLRLLR CQRPADLPA AGSEMQIRPI VMSQKDGDRP  
 KKKVTFNSSS IIFIITSDES LSVDDSDKTN GSKVDVIQVR PL , which is disclosed  
 herein in the three letter amino acid code as set forth in SEQ ID NO:2.

10                    24.    The purified HG51 protein of claim 23 which consists of the amino acid sequence as set forth in SEQ ID NO:2.

                    25.    A method of identifying a substance which modulates HG51 receptor activity, comprising:

15                    (a)    combining a test substance in the presence and absence of a HG51 receptor protein wherein said HG51 receptor protein comprises the amino acid sequence as set forth in SEQ ID NO:2; and,

                    (b)    measuring and comparing the effect of the test substance in the presence and absence of the HG51 receptor protein.

20                    26.    A method for determining whether a substance is a potential agonist or antagonist of HG51 comprising:

                    (a)    transfecting or transforming cells with an expression vector of claim 3 that directs expression of HG51 in the cells, resulting in test cells;

25                    (b)    allowing the test cells to grow for a time sufficient to allow HG51 to be expressed;

                    (c)    exposing the cells to a labeled ligand of HG51 in the presence and in the absence of the substance;

30                    (d)    measuring the binding of the labeled ligand to HG51; where if the amount of binding of the labeled ligand is less in the presence of the substance than in the absence of the substance, then the substance is a potential agonist or antagonist of HG51.

27. A method for determining whether a substance is capable of binding to HG51 comprising:

(a) transfecting or transforming cells with an expression vector of claim 3 that directs the expression of HG51 in the cells, resulting in test cells;

5 (b) exposing the test cells to the substance;

(c) measuring the amount of binding of the substance to HG51;

(d) comparing the amount of binding of the substance to HG51 in the test cells with the amount of binding of the substance to control cells that have not been transfected with HG51;

10 wherein if the amount of binding of the substance is greater in the test cells as compared to the control cells, the substance is capable of binding to HG51.

28. A method for determining whether a substance is capable of binding to HG51 comprising:

15 (a) transfecting or transforming cells with an expression vector of claim 3 that directs the expression of HG51 in the cells, resulting in test cells;

(b) preparing membranes containing HG51 from the test cells and exposing the membranes to a ligand of HG51 under conditions such that the ligand binds to the HG51 in the membranes;

20 (c) subsequently or concurrently to step (b), exposing the membranes from the test cells to a substance;

(d) measuring the amount of binding of the ligand to the HG51 in the membranes in the presence and the absence of the substance;

25 (e) comparing the amount of binding of the ligand to HG51 in the membranes in the presence and the absence of the substance where a decrease in the amount of binding of the ligand to HG51 in the membranes in the presence of the substance indicates that the substance is capable of binding to HG51.

29. A method for determining whether a substance is capable of binding to HG51 comprising:

30 (a) transfecting or transforming cells with an expression vector of claim 3 that directs the expression of HG51 in the cells, resulting in test cells;

(b) preparing membranes containing HG51 from the test cells and exposing the membranes from the test cells to the substance;

(c) measuring the amount of binding of the substance to the HG51 in the membranes from the test cells;

(d) comparing the amount of binding of the substance to HG51 in the membranes from the test cells with the amount of binding of the substance to  
5 membranes from control cells that have not been transfected with HG51, where if the amount of binding of the substance to HG51 in the membranes from the test cells is greater than the amount of binding of the substance to the membranes from the control cells, then the substance is capable of binding to HG51.

10 30. A method of identifying agonists of HG51 comprising:

(a) transfecting or transforming cells with a first expression vector of claim 3 which directs expression of HG51 and a second expression vector which directs the expression of a promiscuous G-protein, resulting in test cells;

(b) exposing the test cells to a substance that is a suspected agonist  
15 of HG51;

(c) measuring the level of inositol phosphates in the cells; where an increase in the level of inositol phosphates in the cells as compared to the level of inositol phosphates in the cells in the absence of the suspected agonist indicates that the substance is an agonist of HG51.

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31. A method of identifying antagonists of HG51 comprising:

(a) transfecting or transforming cells with a first expression vector of claim 3 which directs expression of HG51 and a second expression vector which directs the expression of a promiscuous G-protein, resulting in test cells;

(b) exposing the test cells to a substance that is an agonist of  
25 HG51;

(c) subsequently or concurrently to step (b), exposing the test cells to a substance that is a suspected antagonist of HG51;

(d) measuring the level of inositol phosphates in the cells; where a  
30 decrease in the level of inositol phosphates in the cells in the presence of the suspected antagonist as compared to the level of inositol phosphates in the cells in the absence of the suspected antagonist indicates that the substance is an antagonist of HG51.

32. A method of identifying antagonists of HG51 as recited in claim 31 wherein the first and second expression vectors of step (a) are replaced with a single expression vector which expresses a chimeric HG51 protein fused at its C-terminus to a promiscuous G-protein.

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33. An antibody that binds specifically to HG51 protein wherein the HG51 receptor protein comprises the amino acid sequence as set forth in SEQ ID NO:2.

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